



A PROFESSIONAL CORPORATION  
900 THREE GALLERIA TOWER  
13155 NOEL ROAD  
DALLAS, TEXAS 75240

TELEPHONE (972) 628-3600

FACSIMILE (972) 628-3616

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Fax:

~~703-308-7768~~~~571-273-0275~~  
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From: Robert D. McCutcheon, Esq.

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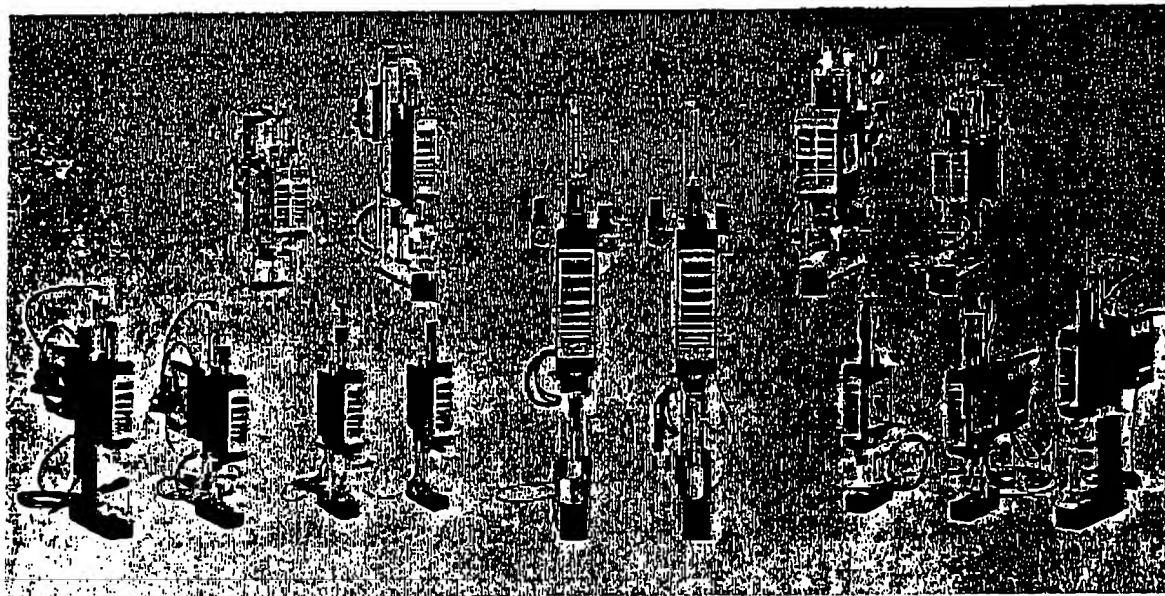
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# WELD HEADS

## **THIN-LINE™ WELD HEADS** **HIGH PERFORMANCE, DURABILITY & LONG LIFE** **80 SERIES, 180 SERIES, 90 SERIES**

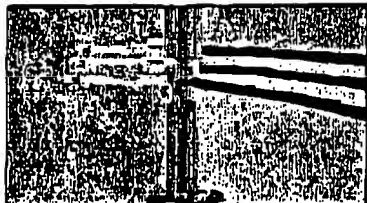


### **Thin-Line Features**

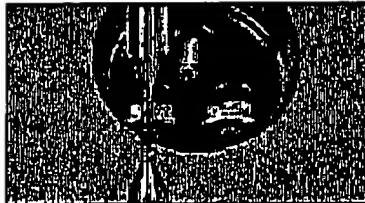
- Adjustable Force-Firing
- Low Inertia Designs
- Air Actuation Option
- Adjustable Tare Spring
- Single Air Regulator (Series 80)
- Up to 1.5 Inch (38mm) Stroke
- Up and Down Stops
- Rugged Design
- EZ-AIR® Technology

### **Benefits**

- Permits high quality, precision small parts welding since welding force is independent of electrode stroke.
- Improves weld consistency, reduces metal expulsion, and improves the appearance of the weld.
- Integrates easily into automated work stations and provides rates exceeding one weld per second at maximum weld force.
- Allows use of custom electrodes without sacrificing performance.
- Simplifies adjustment and increases speed of air actuated heads.
- Allows welding inside deep cavities.
- Increases production rates by allowing user to optimize upper electrode motion.
- Improves productivity, minimizes repair costs and ensures long life.
- Improves consistency and simplifies set-up.



Weld stranded copper wire securely to relay leads or electrical terminals



Weld electrical terminals to solid wire leads



Prismatic NiCd Battery Assembly

## PRECISION PERFORMANCE THROUGH INTELLIGENT DESIGN

### The Thin-Line Ranges

Unitek Peco Thin-Line Weld Heads consist of three families of full-featured products for precision metals joining:

80 Series – 20 lb. (89N)

40 lb. (178N)

180 Series – 100 lb (445 N)

90 Series – 150 lb (667N)

All are precision, low inertia, force-fired designs, with a narrow vertical profile. They are ideal for both production line and bench applications and can operate at speeds greater than 3600 welds per hour.

### Durable High Quality Design

Rugged construction, linear ball bearing bushings and an *over-sized, anti-rotation bearing system* provide perfect linear travel of the upper electrode arm. This system

minimizes the potential for electrode wiping action during the weld, even at maximum force settings. Based on actual test data, *bearing life exceeds 25 million operations* when used according to the specifications.

### High Speed Capability

A top-mounted air actuation system, with a regulator and dual flow controls, ensures repeatable, reliable, high-speed operation in automated applications. Threaded holes on the back of the heads make them easy to mount, without their post or base, in automated work stations. EZ-AIR provides unsurpassed repeatability and ease of set-up.

### Precision Control

Thin-Line Weld Heads add consistency and control to complex welding applications.

Their *low inertia designs* ensure the fast dynamic response required for the electrodes to follow the minute expansion and contraction of the weld joint as it heats and cools. A *differential motion force-firing* system initiates the welding control at the precise moment when the pre-set electrode force is applied to the workpieces.

### Electrodes and Accessories

A complete line of accessories and electrodes are available. Refer to the accessories data sheet 991-160. Optics are available for all heads. All heads are supplied with welding cables, firing switch cables, mounting hardware, and one set of electrodes.

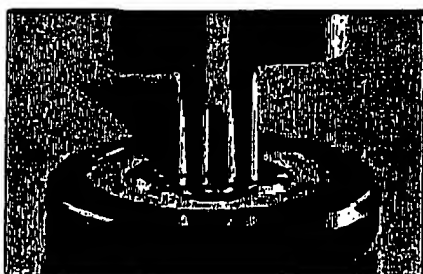
## ELECTRODE CONFIGURATIONS MATCH SPECIFIC APPLICATION NEEDS



*Opposed Weld*

### Opposed Configuration

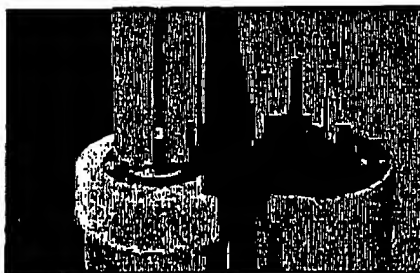
Top and bottom electrodes are used to hold the parts and provide the current path. An opposed weld is preferred over other configurations because it is easier to set-up and control the current path. It should be used whenever possible.



*Series Weld*

### Series Configuration

Using two top electrodes, a series weld can be used when there is no access to the bottom part. Both electrodes contact the top part and current is passed through the top part to the bottom part. Two weld spots are produced, one under each electrode. Independent force control allows for separate adjustment of each electrode force and is used to balance the heat between the two weld spots.

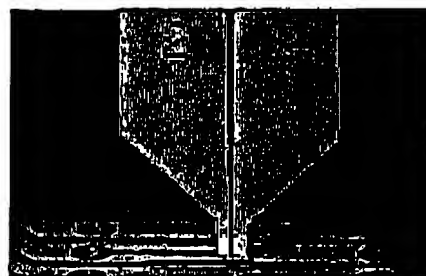


*Step Weld*

### Step Configuration

Thin-Line weld heads designed for series welding can also be set up in a step configuration. Two top electrodes are

used, but one electrode contacts the top part and the other electrode contacts the bottom part. A single weld is produced at the part to part interface. Independent force control allows the electrode force on the bottom part to be set much higher than the force on the top part.



*Parallel Gap Weld*

### Parallel Gap Configuration

Parallel gap welding results in a single weld spot under the gap between the electrodes. It is used to weld very small parts. Two styles of parallel gap electrodes are available: Unitips® which are permanently bonded together with an insulating spacer and fixed gap; and Unibond Electrodes® which allow for adjustment of the gap.

## HIGH QUALITY, FULL FEATURED

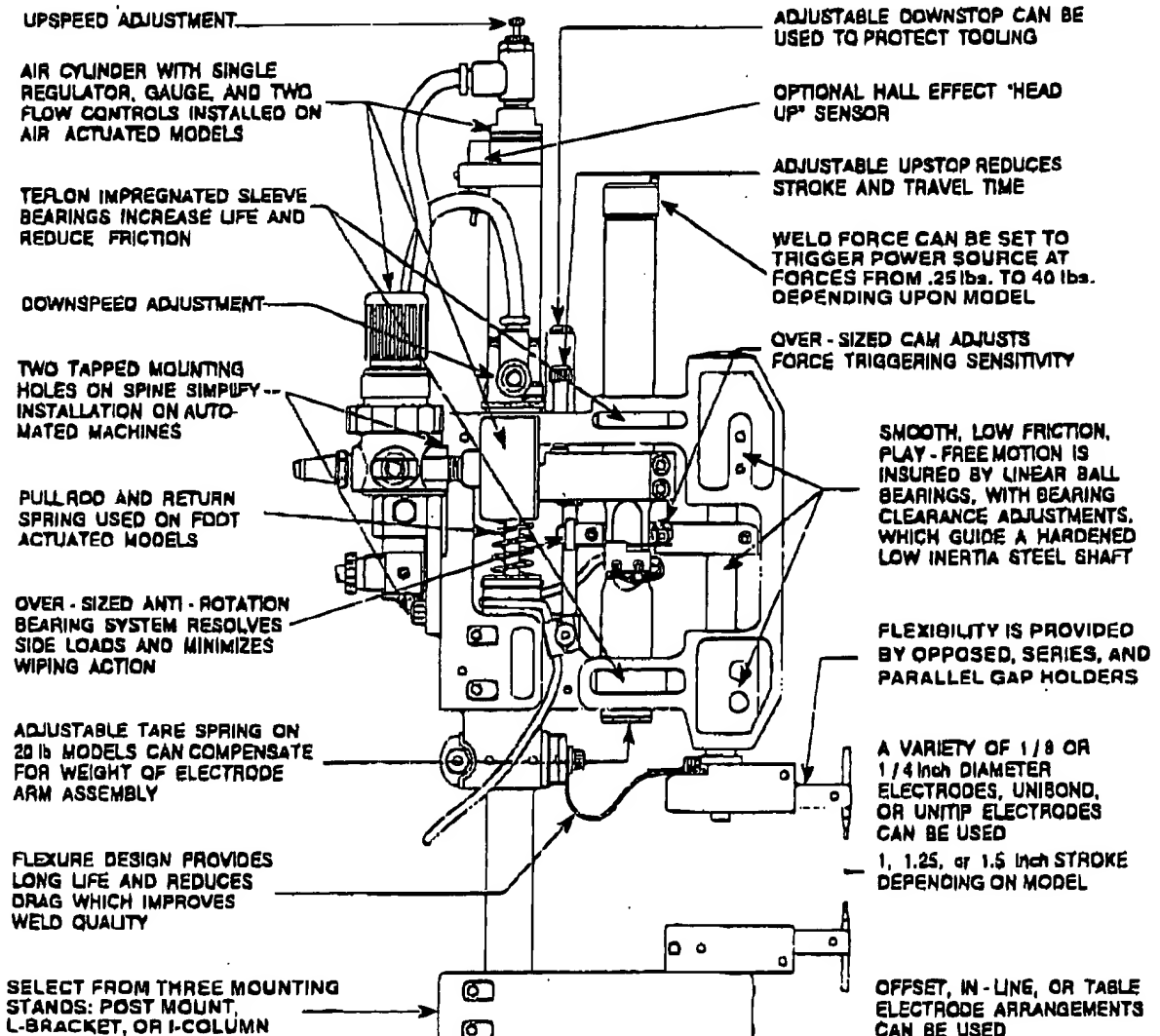
The 80 Series (below), 180 Series, and 90 Series are subjected to environmental life testing designed to guarantee specifications and performance.

Air actuated heads are supplied with an air pressure regulator, two flow controls which are used to independently control the up and down velocity, and a 24-volt AC solenoid (115 volts is an available option). The air actuation system includes a linear spring

which ensures proper operation at low forces. EZ-AIR provides high repeatability and eliminates overforce. The air systems can be moved to other locations when the heads are incorporated in work stations or automated systems. The heads can be supplied with an optional Hall Effect Limit Switch Kit, which will detect when the head is in the up or down position. This feature can prevent damage when automated machine tooling is indexed.



### 80 SERIES DESIGN FEATURES



## 80 SERIES THIN-LINE WELD HEADS

### 80 SERIES THIN-LINE WELD HEADS – FORCE RANGE 0.25 TO 20 LBS (1.1 TO 89 N)

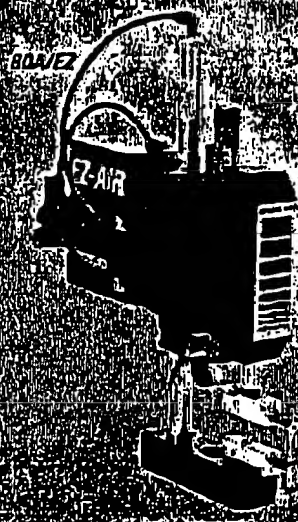
FEATURE	UNIT OF MEASURE	80F <sup>1</sup>	80A	86F <sup>2</sup>	86A <sup>2</sup>	87F <sup>1</sup>	87A	88F	88A
Standard Model									
EZ-AIR Model (Complete Weld Head) <sup>3</sup>			80A/EZ		86A/EZ		87A/EZ		88A/EZ
Actuation		Manual	Air	Manual	Air	Manual	Air	Manual	Air
Weld Force	Maximum lbs (N)	20 (89)	20 (89)	20 (89)	20 (89)	20 (89)	20 (89)	20 (89)	20 (89)
	Minimum lbs (N)	.25 (1.1)	.5 (2.2)	.25 (1.1)	.5 (2.2)	.25 (1.1)	.5 (2.2)	.5 (2.2)	.5 (2.2)
Maximum Rating	KVA (Watt-Seconds)	2 (250)	2 (250)	1 (125)	1 (125)	2 (125)	2 (125)	5 (250)	5 (250)
Maximum Electrode Stroke	Inch (mm)	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)
Electrode Diameter	Inch (mm)	.125 (3.2)	.125 (3.2)	Unibond	Unibond	Thermodes	Thermodes	0.245 (6.2)	0.245 (6.2)
				Unitips	Unitips	Unitips	Unitips		
Electrode Configuration		Opposed	Opposed	Parallel Gap	Parallel Gap	Parallel Gap	N/A	Series	Series
Electrode Holder Type		Offset	Offset	Offset	Offset	Offset	Offset	Offset	Offset
Maximum Throat Size (H x D)	Inch	1.94 x 6.0	1.84 x 6.0	3.38 x 5.19	3.38 x 5.19	2.55 x 5.25	2.55 x 5.25	6.2 x 6.25	6.2 x 6.25
	(mm)	(49 x 152)	(49 x 152)	(88 x 132)	(88 x 132)	(65 x 133)	(65 x 133)	(157 x 159)	(157 x 159)
Maximum Gap between Electrodes	Inch	-	-	0.040	0.040	0.040	0.040	1.75	1.75
	(mm)	-	-	(1.0)	(1.0)	(1.0)	(1.0)	(44.5)	(44.5)
Electrode Series		ES-0400	ES-0400	EU or UT	EU	17 <sup>4</sup> or UT	17 <sup>4</sup>	ES-0800E	ES-0800E
Weld Cable Size & Length	AWG	#2	#2	#2	#2	#2	#2	#2/0	#2/0
	Inch (cm)	11 (28)	11 (28)	11 (28)	11 (28)	11 (28)	11 (28)	11 (28)	11 (28)
Foot Pedal Model		CP	-	CP	-	CP	-	MSP	-
Footswitch Model		-	FSAC, FS1L, FS2L	-	FSAC, FS1L, FS2L	-	FSAC, FS1L, FS2L	-	FSAC, FS1L, FS2L
Air Solenoid Voltage	VAC	-	24 or 115	-	24 or 115	-	24 or 115	-	24 or 115
Air Pressure for Maximum Force	psig (bar)	-	85 (4.5)	-	85 (4.5)	-	65 (4.5)	-	85 (4.5)
Air Cylinder Inside Diameter	Inch (mm)	-	.75 (19)	-	.75 (19)	-	.75 (19)	-	.75 (19)
Cycle Rate: @ Minimum Force	Full Strokes/sec	-	1	-	1	-	1	-	1
	@ > 20% of Rated Force	Full Strokes/sec	2.5	-	2.5	-	2.5	-	2.5
Maximum Dimensions (including stand & Air Kit)	Height – Inch (mm)	13.7 (348)	18.3 (414)	16 (406)	16.5 (419)	16 (406)	18.5 (419)	18.7 (424)	19.3 (490)
	Depth – Inch (mm)	7.6 (193)	9.0 (229)	7.6 (193)	9.1 (231)	7.0 (178)	9.1 (231)	13.5 (343)	13.5 (343)
	Width – Inch (mm)	1.7 (43)	4.6 (117)	2.2 (56)	4.7 (119)	2.2 (56)	4.7 (119)	4 (102)	10.5 (267)
Weight (before packing)	Lbs (kg)	5 (2.3)	7 (3.2)	5.5 (2.5)	7 (3.2)	5.5 (2.5)	7 (3.2)	14 (6.4)	17 (7.7)

(1) Model 80FLF and 87FLF have a force range of 0.25 – 10 lbs (1.1 – 44.5 N).

(2) Model 86FRE and 86ARE use 1/8 inch (3.2mm) diameter Series ES-0400-35° Offset Electrode Holders and Electrodes.

(3) See page 7 for EZ-AIR specifications.

(4) 17BM, 17F, 17M, 17P or 17SR.



Offset/Opposed  
EZ-AIR



Unibond/Parallel Gap



Unibond/Parallel Gap  
EZ-AIR

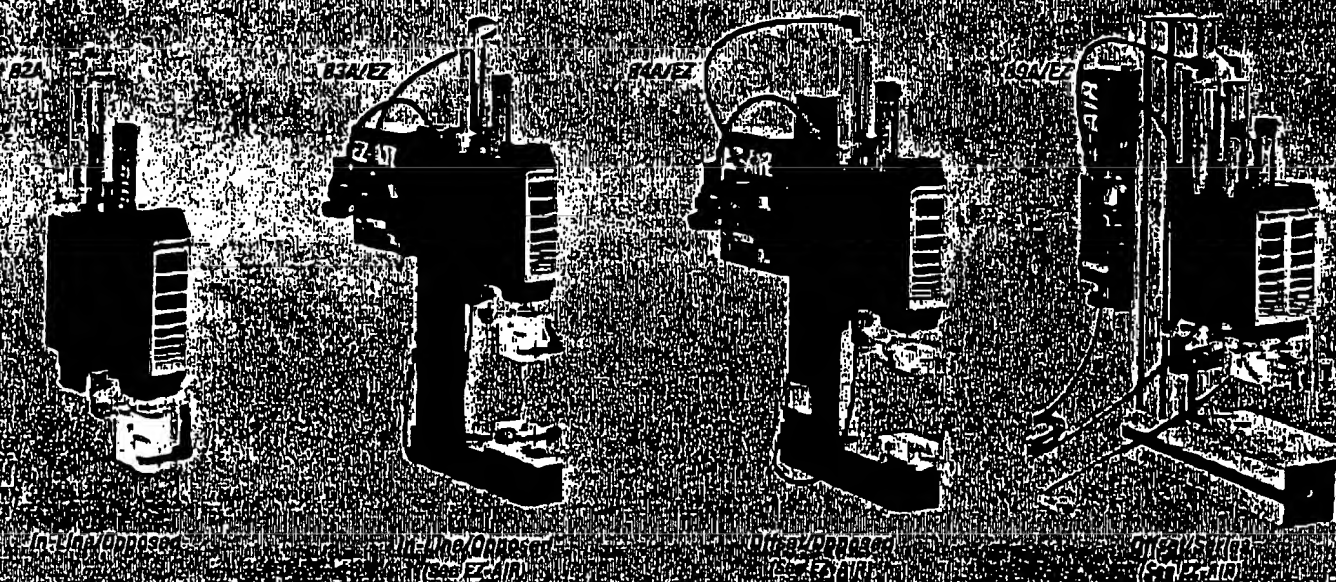
## 80 SERIES THIN-LINE WELD HEADS

### 80 SERIES THIN-LINE WELD HEADS – FORCE RANGE 4 TO 40 LBS (18 TO 178 N)

FEATURE	UNIT OF MEASURE	82A <sup>1</sup>	83F	83A	84F	84A	89F	89A
Standard Model								
EZ-AIR Model (Complete Weld Head) <sup>2</sup>				83A/EZ		84A/EZ		89A/EZ
Actuation		Air	Manual	Air	Manual	Air	Manual	Air
Weld Force	Maximum lbs (N)	40 (178)	40 (178)	40 (178)	40 (178)	40 (178)	40 (178)	40 (178)
	Minimum lbs (N)	6 (27)	4 (18)	6 (27)	4 (18)	6 (27)	4 (18)	6 (27)
Maximum Rating	KVA (Watt-Seconds)	5 (250)	5 (250)	5 (250)	5 (250)	5 (250)	5 (250)	5 (250)
Maximum Electrode Stroke	Inch (mm)	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)
Electrode Diameter	Inch (mm)	.25 (6.4)/ .125 (3.2)	.25 (6.4)/ .125 (3.2)	.25 (6.4) .125 (3.2)	.25 (6.4)	.25 (6.4)	0.245 (6.2)	0.245 (6.2)
Electrode Configuration		Opposed	Opposed	Opposed	Opposed	Opposed	Series	Series
Electrode Holder Type		In-Line	In-Line	In-Line	Offset	Offset	Offset	Offset
Maximum Throat Size (H x D)	Inch (mm)	N/A	1.8 x 3.1 (46 x 79)	1.8 x 4.8 (46 x 122)	3.3 x 6.1 (84 x 155)	3.3 x 7.8 (84 x 198)	8.7 x 5.6 (221 x 142)	8.7 x 8.2 (221 x 208)
Maximum Gap between Electrodes	Inch (mm)	-	-	-	-	-	1.75 (44.5)	1.75 (44.5)
Electrode Series		ES-0800/ ES-0400	ES-0800/ ES-0400	ES-0800/ ES-0400	ES-0800	ES-0800	ES-0800E	ES-0800E
Weld Cable Size & Length	AWG Inch (cm)	#2/0 11 (28)	#2/0 11 (28)	#2/0 11 (28)	#2/0 11 (28)	#2/0 11 (28)	#2/0 11 (28)	#2/0 11 (28)
Foot Pedal Model		-	MSP	-	MSP	-	MSP	-
Footswitch Model		FSAC, FS1L, FS2L	-	FSAC, FS1L, FS2L	-	FSAC, FS1L, FS2L	-	FSAC, FS1L, FS2L
Air Solenoid Voltage	VAC	24 or 115	-	24 or 115	-	24 or 115	-	24 or 115
Air Pressure for Maximum Force	psig (bar)	55 (3.8)	-	55 (3.8)	-	55 (3.8)	-	55 (3.8)
Air Cylinder Inside Diameter	Inch (mm)	1.0625 (27)	-	1.0625 (27)	-	1.0625 (27)	-	1.0625 (27)
Cycle Rate: ⊕ Minimum Force	Full Strokes/sec	1	-	1	-	1	-	1
⊕ > 20% of Rated Force	Full strokes/sec	2.5	-	2.5	-	2.5	-	2.5
Maximum Dimensions	Height – Inch (mm)	18.2 (411)	17.4 (442)	20.1 (511)	16.7 (424)	19.3 (490)	21.9 (556)	24.5 (622)
(Including stand & Air Kit)	Depth – Inch (mm)	17.7 (450)	7.9 (201)	9.8 (244)	10.0 (254)	11.9 (302)	14.6 (371)	16.0 (408)
	Width – Inch (mm)	4.6 (117)	2.6 (66)	4.6 (117)	2.6 (66)	4.6 (117)	4.9 (124)	10.5 (267)
Weight (before packing)	Lbs (kg)	5 (2.3)	7 (3.2)	9 (4.1)	8 (3.6)	10 (4.5)	20 (9.1)	23 (10.4)

(1) Model 82A is the same as Model 83A with the mounting stand, lower electrode holder and lower electrode omitted.

(2) See page 7 for EZ-AIR specifications.



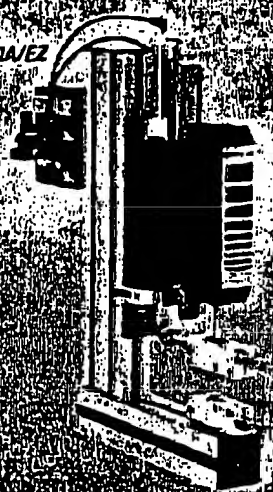
## 180 & 90 SERIES THIN-LINE WELD HEADS

### 180 SERIES MID-FORCE WELD HEADS FORCE RANGE 5 TO 100 LBS (22 TO 445 N)

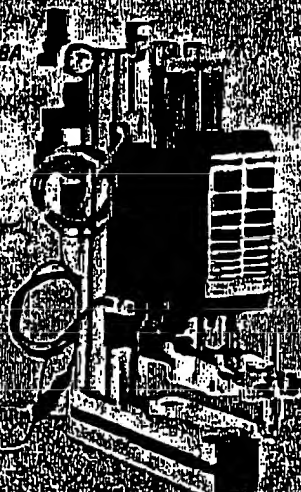
### 90 SERIES HIGH-FORCE WELD HEADS FORCE RANGE 7 TO 150 LBS (31 TO 667 N)

FEATURE	UNIT OF MEASURE	180F	180A	182A	188A	90A	90ADT
Standard Model		180F	180A	182A	188A	90A	90ADT
EZ-AIR Model (Complete Weld Head) <sup>1</sup>		180A/EZ	180A/EZ	182A	188A/EZ		
Actuation		Manual	Air	Air	Air	Air	Air
Weld Force	Maximum lbs (N)	100 (445)	100 (445)	100 (445)	100 (445)	150 (667)	100 (445)
	Minimum lbs (N)	5 (22)	5 (22)	5 (22)	5 (22)	7 (31)	7 (31)
Maximum Rating	KVA (Watt-Seconds)	20 (875)	20 (875)	20 (875)	20 (875)	30 (1000)	20 (875)
Maximum Electrode Stroke	Inch (mm)	1.25 (32)	1.25 (32)	1.25 (32)	1.25 (32)	1.5 (38)	1.5 (38)
Electrode Diameter	Inch (mm)	.25 (6.4)	.25 (6.4)	.25 (6.4)	.245 (6.22)	.25 (6.4)	.25 (6.4)
Electrode Configuration		Opposed	Opposed	Opposed	Series	Opposed	Opposed
Electrode Holder Type		Offset	Offset	In-Line	Offset	In-Line	Offset
Maximum Throat Size (H x D)	Inch	6.1 x 8.5	6.1 x 11.1	2.8 x 6.3	8.0 x 11.5	2.125 x 6.2	5.75 x 11
	(mm)	(154.9 x 215.9)	(154.9 x 281.9)	(71.1 x 160.0)	(152.4 x 292.1)	(54.0 x 157)	(146.1 x 279.4)
Maximum Gap between Electrodes	Inch	-	-	-	3.0	-	-
	(mm)	-	-	-	(76.2)	-	-
Electrode Series		ES-0800	ES-0800	ES-0800	ES-0800E	ES-0800	ES-0800
Weld Cable Size & Length	AWG	#2/0	#2/0	#2/0	#2/0	#2/0	#2/0
	Inch (cm)	16 (41)	16 (41)	16 (41)	16 (41)	16 (41)	16 (41)
Foot Pedal Model		MSP	-	-	-	-	-
Footswitch Model		-	FSAC, FS1L FS2L	FSAC, FS1L FS2L	FSAC, FS1L FS2L	FSAC, FS1L FS2L	FSAC, FS1L FS2L
Air Solenoid Voltage	VAC	-	24 or 115	24 or 115	24 or 115	24 or 115	24 or 115
Air Pressure for Maximum Force	psig (bar)	-	60 (4.4)	60 (4.4)	60 (4.4)	60 (4.4)	60 (4.4)
Air Cylinder Inside Diameter	Inch (mm)	1.5 (38.1)	1.5 (38.1)	1.5 (38.1)	1.5 (38.1)	1.0625 (27)	1.0625 (27)
Cycle Rate: @ Minimum Force	Full Strokes/sec	-	1	1	1	1	1
@ > 20% of Rated Force	Full Strokes/sec	-	2	2	2	1.5	1.5
Maximum Dimensions	Height - Inch (mm)	24 (610)	24.75 (629)	25 (635)	24.9 (632)	31.1 (790)	31.1 (790)
(Including stand & Air Kit)	Depth - Inch (mm)	14.9 (378)	16.5 (419)	13.4 (340)	18.1 (460)	13 (330)	16 (406)
	Width - Inch (mm)	3.1 (79)	6.8 (168)	6.4 (163)	6.8 (168)	6.6 (168)	6.6 (168)
Weight (before packing)	Lbs (kg)	18.5 (8.4)	21.5 (9.8)	21.5 (9.8)	36.5 (16.6)	37.5 (17)	38.5 (17.5)

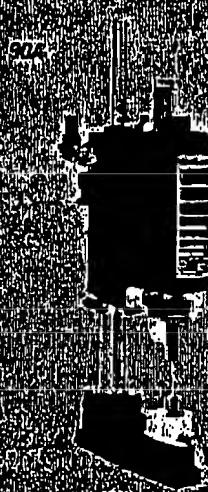
(1) See page 7 for EZ-AIR specifications.



Offset/Opposed  
(See EZ-AIR)



Offset/Offset  
(See EZ-AIR)

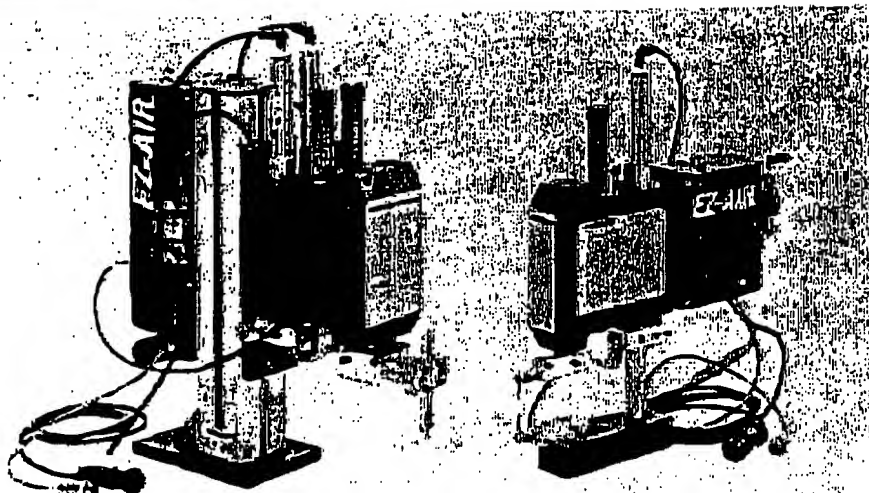


In-Line/Opposed



Offset/Opposed

## EZ-AIR TECHNOLOGY



The EZ-AIR weld force control system simplifies the set-up process to a single adjustment and helps prevent weld over-force by closing off the input air when the actual weld force reaches the programmed weld force level, delivering accurate force control which is repeatable across multiple weld heads without complex setup or operator training.

- Firing force is important because it controls contact resistances and, therefore, heat generation at the electrode-to-part and part-to-part interface.
- Superior force control = process stability and higher production yield with reduced maintenance time.

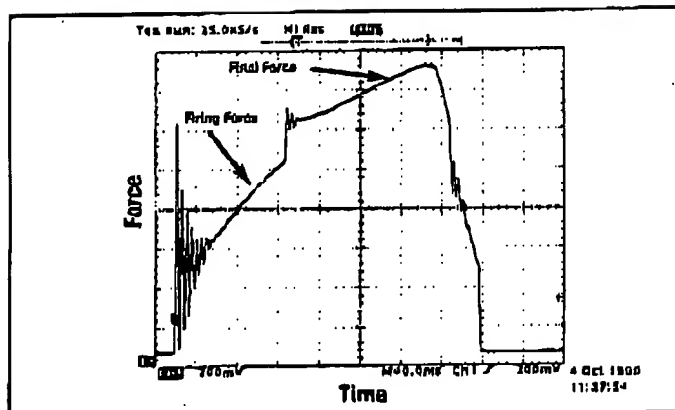
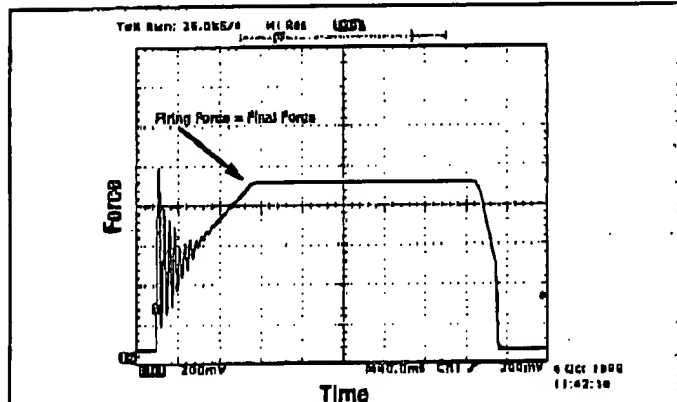
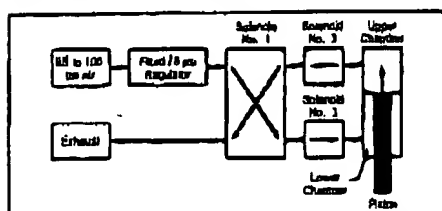


Figure 1, above, shows an incorrect balance of firing force to air pressure set by an operator after cleaning the electrodes, on a traditional weld head, resulting in poor set-up and force control.

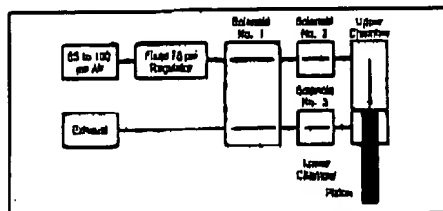


EZ-AIR insures correct set-up and good force control as seen in Figure 2, above. The Unitek Peco EZ-AIR requires no balancing of air pressure as the air pressure is constant once the firing force is reached.

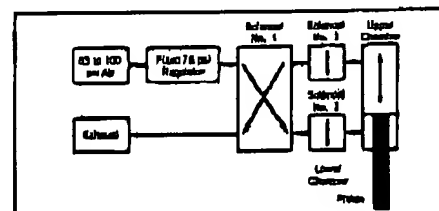
The following series of simplified diagrams explain how the EZ-AIR weld force control system works through independent control of upper and lower air chambers.



Electrode up position - air pressure in the lower chamber keeps the piston in the up position. Waste air exhausts from the upper chamber.



Electrode moves down - air pressure in the upper chamber forces the piston down. Waste air exhausts from the lower chamber.



Electrode reaches weld force - both solenoid valves close within 4ms and air pressure is trapped in both the upper and lower chambers. Weld force remains constant since the air cylinder piston cannot move. Compression spring provides instantaneous follow-up.



EZ-AIR force control technology is available with Unitek Peco Thin-Line weld heads as original equipment and as a retrofit for previously purchased Thin-Line air actuated weld heads. See the Ordering Guide for more information.

## THIN-LINE WELD HEAD ORDERING GUIDE

MODEL		DESCRIPTION	
WELD HEADS		Weld head, manual or air actuation, or EZ-AIR model, please refer to Weld Head Table, pages 4, 5 and 6, for model numbers and specifications. For air actuation, add /24 for 24 VAC or /115 for 115 VAC solenoid. Example: 80A/24, Model 80A with 24 VAC solenoid. For EZ-AIR model, add /EZ. Example: 80A/EZ, Model 80A with EZ-AIR.	
80 Series, 180 Series, 90 Series			
FOOT ACTUATORS		Model	Head Type Description
		FS1L	Air or EZ-AIR Footswitch, single level (for all pneumatic weld heads).
		FS2L	Air or EZ-AIR Footswitch, two level (for all pneumatic weld heads).
		FSAC	Air (115 VAC) AC Footswitch, single level. Switches 115VAC-50/60Hz to air which does NOT have a built-in valve driver.)
		CP	Manual Cable pedal, rated: 25 lbs., 1" stroke, with 6-foot cable (for models 80F, 88F, or 87F).
		MSP	Manual Foot pedal, medium force swing type, rated: 100 lbs., 5:1 mechanical advantage (for models 83F, 84F, 88F, 89F, or 180F).
HEAD OPTIONS & ACCESSORIES		Model	Type Description
		HS20	Option Hall effect sensor kit for 20 lb. cylinders. Includes: cylinder, clamp, and sensor. Use on 80A, 88A, 87A, 88A. 88A requires two kits.
		HS40	Option Hall effect sensor kit for 40 lb. cylinders. Includes: cylinder, clamp, and sensor. Use on 82A, 83A, 84A, 89A. 89A requires two kits.
		OFS	Accessory Firing switch junction box. Connects two firing switch cables in parallel to one power supply.
		OFS/88	Accessory Series firing switch junction box. Connects two firing switch cables in series (Included in models 88, 89, and 188).
		BPTL	Accessory Base plate, anodized. Supports optic mounting assembly.
VIEWING ACCESSORIES			
OMA	Optic mounting assembly. Use with NIKON, and BPTL.		
NIKON	Optic, stereo zoom, NIKON, 10X eyepiece, 0.5X auxiliary objective lens.		
BLFOI	Fiber optic illuminator system, 115V-50/60Hz. Self-supporting gooseneck, bifurcated light pipes, focusing lenses and mounting adapter for optic mounting assembly.		
BLFOV230	Fiber optic illuminator system, 230V-50/60Hz. Self-supporting gooseneck, bifurcated light pipes, focusing lenses for mounting adapter for optic mounting assembly.		
PROCESS SET-UP TOOLS			
		FG20	Electrode force gage, 20 lb., scale 20 lb. x 0.2 lb.
		FG100	Electrode force gage, 100 lb., scale 100 lb. x 1 lb.
		FG200	Electrode force gage, 200 lb., scale 200 lb. x 2 lb.
		FG10KG	Electrode force gage, 10 kg., scale 10 kg. x 0.1 kg.
		FG100KG	Electrode force gage, 100 kg., scale 100 kg. x 1 kg.
		All available with or without serial number.	
MISCELLANEOUS ACCESSORIES			
		UTA	Unitp adapter, allows use of Unitp electrodes in model 88.
		WP	Work Positioner, 3-inch diameter. Height adjustable from 1-7/16 to 2 inches (models 86, 87, 88, 89).

## EZ-AIR SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Force Adjustment Range Models: 80A/EZ, 88A/EZ, 88A/EZ	1 to 20 lbs (4.4 to 89N)
Force Adjustment Range Models: 83A/EZ, 84A/EZ, 89A/EZ	4 to 40 lbs (17.8 to 178N)
Force Adjustment Range Models: 180A/EZ	5 to 100 lbs (22 to 445N)
Valve Driver Input	24 VAC
Input Air Pressure	85 to 130 psi (482 kPa to 896 kPa), unlubricated air
<b>ORDERING GUIDE</b>	
With a Weld Head	Specify XXX/EZ where XXX is the weld head (80, 83, 84, 86, 88, 89, 180). Example: 80A/EZ for an 80 ThinLine Weld Head
As a Retrofit Kit	Specify EZ/SAK for use with a head with a single air cylinder. Specify EZ/DAK for use with a head with dual (two) air cylinders.

Your Local Representative



A UNITEK MIYACHI INTERNATIONAL COMPANY

Corporate Office: 1820 S. Myrtle Ave. • P.O. Box 5033 • Monrovia, CA 91017-7133 USA  
Tel: (626) 303-5678 • FAX: (626) 358-8048 • E-Mail: info@unitekequipment.com  
Internet: http://www.unitekequipment.com

### EASTERN (USA) Sales Office:

21 Cummings Park,  
Suite 252  
Woburn, MA 01801  
Tel: (781) 838-0442  
FAX: (781) 935-1485  
E-Mail: east@unitek.com  
unitekequipment.com

### NORTH ASIA Sales Office:

Unit D, 20/F, Infotech Centre  
21 Hung To Road  
Kwun Tong, Hong Kong  
Tel: +852 2833-6998  
FAX: +852 2833-6872  
E-Mail: asia@unitek.com  
unitekequipment.com

### UNITEX EUROPE:

Schootenweg 21  
NL-5708 HZ Helmond  
The Netherlands  
Tel: +31 482-54-22-25  
FAX: +31 492-53-82-22  
E-Mail: info@unitekeurope.com

### PECO WELDING

SYSTEMS GmbH  
Lindberghstrasse 1  
D-82178 Puchheim  
Germany  
Tel: +49-89 83 94 03 79  
FAX: +49-89 83 94 03 88

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